

REMARKS

Claims 1, 3-12 and 15-27 are pending in the present application. Claims 1, 3-12 and 15-27 have been rejected by the Examiner. By this Response, claims 1 and 11 have been amended as discussed with the Examiner, and claims 8 and 26 have been cancelled. The Applicant respectfully submits that the pending claims define allowable subject matter.

Claim 1 has been amended to incorporate the limitations of claim 8. The limitations of claim 26 have been incorporated into amended claim 11. Claim 11 has also been amended to recite the limitation that the processor is capable of masking at least one non-clinical region based on at least one of gray scale maximum and minimum values for the at least one non-clinical region, the at least one non-clinical region comprising at least one of a raw radiation region and a collimated region. The Applicant respectfully submits that independent claims 1 and 11, as well as their dependent claims, should be allowable.

Claims 1, 3-12 and 15-27 were rejected under 35 U.S.C. § 102(e) as being anticipated by Ergun et al. (USP 6,298,109).

Ergun relates to a system for voltage and current adjustment for an x-ray tube based on two exposures at different voltages (Abstract; col. 2, lines 60-65). A generalized image transformation polynomial is used to remove image distortion and rotate the image (Abstract; col. 3, lines 38-52). A scatter map may also be calculated to reduce scatter in the image (Abstract).

Ergun relates to a C-arm x-ray system in which the x-ray tube is connected to an x-ray tube power supply which separately controls the current and voltage to the x-ray tube based on signals received from a computer (col. 7, lines 12-25). A charge couple device (CCD) camera provides digital radiation values to the computer for processing (col. 7, lines 31-67). The computer compares the current image pixels to the last pixels obtained from the image (col. 8, lines 10-15). A difference between the pixel values reflects a difference in the amount of x-ray flux received at the CCD camera (col. 8, lines 15-20). The difference is mapped to a weight between zero and one

(col. 8, lines 15-21). The weighted pixels may be used to reduce noise in the image (col. 8, lines 22-58).

Ergun also remaps data from the CCD camera to the image to correct for pincushion-type distortion (col. 9, lines 15-18). Parameters may be used to reduce distortion and rotate the image with polynomials and pixel shift information (col. 9, lines 40-67; col. 10, lines 1-13). Radiation data may then be mapped to pixel brightness using a second transformation (col. 10, lines 48-60). Ergun further controls the fluence of the x-ray beam as a function of tissue density to control exposure and noise (col. 10, lines 63-67; col. 11, lines 1-10).

Additionally, the system of Ergun attempts to eliminate "background pixels" by binning pixels from the CCD camera according to their values to create a multiple peaked plot (col. 11, lines 13-32). Pixels associated with a certain value are removed from the exposure rate calculation (col. 11, lines 54-61). Then, the exposure rate is calculated based on the values of the remaining pixels, and an amperage and voltage value are transmitted to the x-ray tube power supply (col. 11, lines 62-66). Background pixel elimination is based on the type of material being imaged (col. 15, lines 6-10).

Scatter reduction may also be pursued in Ergun used two images obtained at different x-ray energies (col. 15, lines 33-45). A scatter map may be formed using an occluder with a plurality of x-ray blocking lead pins (col. 15, lines 66-67; col. 16, lines 1-40). The scatter map is normalized and subtracted from the image to reduce scatter in the image (col. 16, lines 57-67; col. 17, lines 1-2).

Thus, Ergun does not teach dividing a digital medical image into at least two bands of predetermined width. Ergun does not teach determining a dynamic range of a digital medical image containing a clinical region for a medical imaging system. These limitations are recited in independent claim 1. Rather, Ergun forms a scatter map from two images obtained at different x-ray energies to reduce scatter and eliminates background pixels by binning pixels according to their values, not according to regions or bands in an image. The two dimensional block of Figure 19 does not indicate two bands in an image (col. 10, lines 21-26). Additionally, Ergun does not teach

determining whether the digital medical image within the bands includes at least one non-clinical region. This limitation is also recited in claim 1. As mentioned above, Ergun does not divide the image into bands of predetermined width. Ergun bins and eliminates individual pixel values, wherever they may be in the image. Ergun also does not teach calculating a dynamic range based on a clinical region within each of the bands. This limitation is recited in claim 1. As discussed above, this is neither the intent nor the teaching of Ergun.

Consequently, the Applicant respectfully submits that claim 1, as amended, and its dependent claims are allowable over Ergun, and an action to that effect is requested.

Turning now to independent claim 11, the Applicant respectfully submits that Ergun does not teach the limitations of claim 11 or its dependent claims. As described above, Ergun does not teach a processor dividing the digital medical image into at least two bands. This limitation is recited in amended claim 11. Ergun also does not teach a dynamic range module determining a dynamic range of a clinical region of the image within the at least two bands. This limitation is also recited in amended claim 11. Furthermore, Ergun does not teach a segmentation module in a medical diagnostic imaging system identifying clinical and non-clinical regions within a digital medical image, wherein the non-clinical regions comprise at least a collimated region. This limitation is recited by independent claim 11.

Thus, the Applicant respectfully submits that claim 11, as amended, and its dependent claims are allowable over Ergun, and an action to that effect is requested.

CONCLUSION

The Applicant respectfully submits that the pending claims define allowable subject matter. Should anything remain in order to place the present application in condition for allowance, the Examiner is kindly invited to contact the undersigned at the telephone number listed below.

Please charge any additional fees or credit overpayment to the Deposit Account of McAndrews, Held & Malloy, Ltd., Account No. 070845.

Respectfully submitted,

Date: September 12, 2003

By: Christopher N. George
Christopher N. George
Reg. No. 51,728

McANDREWS, HELD & MALLOY, LTD.
500 West Madison Street, Suite 3400
Chicago, Illinois 60661
Telephone: (312) 775-8000